

Signature Routing Log

General Information:

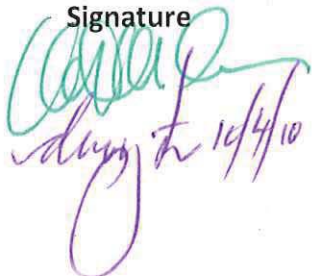
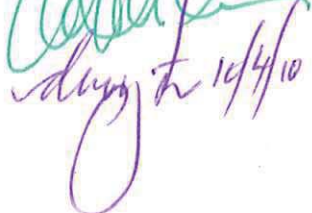


Current Degree Title and Major Name: BS in Biology

Proposal Contact Person Name: Ruth E. Beattie Phone: 257-7647 Email: rebeat1@uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
Biology Faculty	March 13, 2009	Dr. Vincent Cassone, Chair / 257-6766 / vincent.cassone@uky.edu	
Mathematics	11/3/09	Dr. David Royster, DUS / 257-1258 / david.royster@uky.edu	
A&S Ed. Policy Cmte	10/5/10	G. Murthy / 7-4729 / ganpathy.murhty@uky.edu	
A&S Dean	10/5/10	Anna Bosch, Associate Dean / 7-6689 / bosch@uky.edu	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision ³
Undergraduate Council	11/09/2010	Sharon Gill	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Digitally signed by Sharon Gill
DN: cn=Sharon Gill, o=Undergraduate Education,
ou=Undergraduate Council, email=sgill@uky.edu, c=US
Date: 2010.11.10 10:40:00Z

Comments:

³ Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

CHANGE UNDERGRADUATE PROGRAM FORM

1. General Information

College:	<u>A&S</u>	Department:	<u>Biology</u>
Current Major Name:	<u>Biology</u>	Proposed Major Name:	<u>same</u>
Current Degree Title:	<u>Bachelor of Science with a major in Biology</u>	Proposed Degree Title:	<u>same</u>
Formal Option(s):	<u>N/A</u>	Proposed Formal Option(s):	<u>N/A</u>
Specialty Field w/in Formal Option:	<u>N/A</u>	Proposed Specialty Field w/in Formal Options:	<u>N/A</u>
Date of Contact with Associate Provost for Academic Administration ¹ :		<u>August 21, 2010</u>	
Bulletin (yr & pgs):	<u>2010/2011 / 116 - 117</u>	CIP Code ¹ :	<u>26.0101</u>
Accrediting Agency (if applicable):		<u>n/a</u>	
Requested Effective Date:	<input type="checkbox"/> Semester following approval.	OR	<input checked="" type="checkbox"/> Specific Date ² : <u>Fall 2011</u>
Dept. Contact Person:	<u>Ruth E Beattie</u>	Phone:	<u>257.7647</u>
		Email:	<u>rebeat1@uky.edu</u>

2. University Studies Requirements or Recommendations for this Program.

	Current	Proposed
I. Mathematics	<u>completed by premajor requirements</u>	<u>see attached documentation for General Education requirements of proposed program</u>
II. Foreign Language	<u>0 - 8</u>	_____
III. Inference-Logic	<u>completed by Premajor requirement</u>	_____
IV. Written Communication	<u>ENG 104 or Honors</u>	_____
V. Oral Communication	<u>Suspended through Fall 2009</u>	<u>Suspended through Fall 2009</u>
VI. Natural Sciences	<u>Completed by Premajor</u>	_____
VII. Social Sciences	<u>6</u>	_____
VIII. Humanities	<u>6</u>	_____
IX. Cross-Cultural	<u>choose a humanities course/ 3</u>	_____
X. USP Electives (3 must be outside the student's major)	<u>choose a social science course/ 3</u>	_____

3. Explain whether the proposed changes to the program (as described in sections 4 to 12) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).

The program changes involve courses offered by the Department of Mathematics. Two new calculus courses

¹ Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration (APAA). If you do not know the CIP code, the (APAA) can provide you with that during the contact.

² Program changes are typically made effective for the semester following approval. No program will be made effective until all approvals are received.

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have been developed by the Department of Mathematics for the biology program. These courses, MA 137 and MA 138 were approved in the academic year 2009/2010.

Other courses taken outside the Department of Biology (chemistry and physics) remain unchanged.

4. Explain how satisfaction of the University Graduation Writing Requirement will be changed.

Current <input type="checkbox"/> Standard University course offering. List: _____	Proposed <input type="checkbox"/> Standard University course offering. List: _____
<input checked="" type="checkbox"/> Specific course – list: <u>any Humanities GWR course</u>	<input checked="" type="checkbox"/> Specific course) – list: <u>same</u>

5. List any changes to college-level requirements that must be satisfied.

Current <input type="checkbox"/> Standard college requirement. List: _____	Proposed <input type="checkbox"/> Standard college requirement. List: _____
<input type="checkbox"/> Specific required course – list: _____	<input type="checkbox"/> Specific course – list: _____

6. List pre-major or pre-professional course requirements that will change, including credit hours.

Current <u>BIO 150, BIO 151, BIO 152, BIO 153 - 10 hours</u> <u>CHE 105, CHE 107, CHE 111, CHE 113 - 9 hours</u> <u>MA 123 or MA 113 - 3 or 4 hours</u>	Proposed <u>BIO 148, BIO 152, BIO 155 - 7 hours</u> <u>CHE 105, CHE 107, CHE 111, CHE 113 - 9 hours</u> <u>MA 137 and MA 138 or MA 113 and MA 114 - 8 hours</u>
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7. List the major's course requirements that will change, including credit hours.

Current <u>Minimum major requirement for graduation is 50 credit hours in courses not open to freshmen. The minimum GPA of all Major and Premajor courses must be at least 2.0</u> <u>BIO 304 - 3 hours</u> <u>BIO 315 - 3 hours</u> <u>BIO 325 - 4 hours</u> <u>*BIO 350 or BIO 430G 4 or 3 hours</u> <u>BIO 425 or BIO 499 - 1 hour</u> <u>CHE 230, CHE 231, CHE 232</u> or <u>CHE 231/ 236, and BCH 401G - 8 hours</u>	Proposed <u>Minimum major requirement for graduation is 57 credit hours in courses not open to freshmen. The minimum GPA of all Major and Premajor courses must be at least 2.0</u> <u>Major Core</u> <u>Ist tier CORE</u> <u>BIO 303 - 4 hours</u> <u>BIO 304 - 4 hours</u> <u>2nd Tire CORE</u> <u>BIO 315 - 4 hours</u> <u>BIO 325 - 4 hours</u> <u>BIO 350 or BIO 430G - 4 hours</u>
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PHY 211 and PHY 213 or PHY 231 / 232/ 241/242 - 8 hours

Other course work required:

16 or 17 hours to be chosen from 200+ level BIO courses (excluding BIO 208) or the list below. Two courses must contain a laboratory component.. Up to 3 hours of BIO 395 may be used to satisfy the laboratory requirement. A total of six hours of Independent Research (395) from biological sciences departments may be counted within the 16 hour requirement; however, only BIO 395 is accepted for honors in biology. Note: ANA 209, BIO 208 and PGY 206 CANNOT be used for this requirement.

50 hours total required

Acceptable biology electives from outside the department.

Anthropology

ANT 332 (3) Human Evolution

Chemistry

CHE 226 (3-5) Analytical Chemistry

CHE 233 (2) Organic Chemistry

Laboratory II CHE 395 (1-3) Independent Research in Chemistry

A total of 6 hours of 395 coursework (ANA, BCH, CHE, PSY 395) can count as electives in Biology

ONLY BIO 395 is accepted for

Honors in Biology

CHE 440 G (4) Physical Chemistry CHE

441G (2) Physical Chemistry Lab

CHE 442G (3) Physical Chemistry CHE

446G (3) Physical Chemistry for Engineers

CHE 532 (2) Spectrometric ID of

Organic Compounds

CHE 533 (2) Qualitative Organic

Analysis Lab

CHE 550 (3) Biological Chemistry I

CHE 552 (3) Biological Chemistry II

CHE 558 (3) Hormone Receptors and Cell

Signals

CHE 565 (3) Environmental Chemistry

Geology

GLY 401G (3) Invertebrate Paleontology and evolution

Arts & Sciences

A&S 300 Acceptable as upper-level credit ONLY when offered by the Dept of Biology.

A&S 500 Acceptable as upper-level credit ONLY when offered by the Dept of Biology.

Psychology

Statistics - take any General Education Statistical Reasoning Course - 3 hours

BIO 425 or BIO 499 - 1 hour

Core Required hours = 24

Other course work required

CHE 230, CHE 231, CHE 232 - 8 hours

PHY 211 and PHY 213 or

PHY 231/241 and PHY 232/ 242 - 10 hours

15 hours of acceptable biology electives.

Other course work required:

15 hours to be chosen from 200+ level BIO courses (excluding BIO 208) or the list below. Two courses must have labs ONE of which may be BIO 395. A maximum of only six credits of BIO 395 may be used as electives in this section. A total of six hours of Independent Research (395) from biological sciences departments may be counted within the 15 hour requirement; however, only BIO 395 is accepted for honors in biology. Note: ANA 209, BIO 208 and PGY 206 CANNOT be used for this requirement

57 total hours required for major

Acceptable biology electives from outside the Department:

Anthropology

ANT 332 (3) Human Evolution

Chemistry

CHE 226 (3-5) Analytical Chemistry

CHE 233 (2) Organic Chemistry

Laboratory II

CHE 440 G (4) Physical Chemistry CHE

441G (2) Physical Chemistry Lab

CHE 442G (3) Physical Chemistry CHE

446G (3) Physical Chemistry for Engineers

CHE 532 (2) Spectrometric ID of

Organic Compounds

CHE 533 (2) Qualitative Organic

Analysis Lab

CHE 550 (3) Biological Chemistry I

CHE 552 (3) Biological Chemistry II

CHE 558 (3) Hormone Receptors and Cell

Signals

CHE 565 (3) Environmental Chemistry

Geology

GLY 401G (3) Invertebrate Paleontology

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<u>PSY 312</u>	(3)	<u>Brain and Behavior</u>	<u>and evolution</u>
<u>PSY 456</u>	(4)	<u>Behavioral</u>	<u>Arts & Sciences</u>
<u>Neuroscience*</u>			<u>A&S 300 Acceptable as upper-level credit</u>
<u>PSY 459</u>	(3)	<u>Drugs and Behavior</u>	<u>ONLY when offered by the Dept of Biology.</u>
<u>PSY 552</u>	(4)	<u>Animal Behavior</u>	<u>A&S 500 Acceptable as upper-level credit</u>
<u>PSY 565</u>	(3)	<u>Advanced Topics In</u>	<u>ONLY when offered by the Dept of Biology.</u>
<u>Neuroscience</u>			
<u>Statistics (Biology usually accepts only one of the following for each student)</u>			
<u>STA 281</u>	(3)	<u>Probability and</u>	
<u>Statistics Using Interactive Computer Techniques</u>			
<u>STA 291</u>	(3)	<u>Statistical Method</u>	
<u>STA 292</u>	(1)	<u>Descriptive Statistics</u>	
<u>STA 503</u>	(4)	<u>Introduction to</u>	
<u>Statistical Methods</u>			
<u>STA 570</u>	(4)	<u>Basic Statistical</u>	
<u>Analysis</u>			
<u>STA580</u>	(3)	<u>Biostatistics I</u>	
<u>Other STA courses may be accepted at the discretion of your advisor, and this may depend upon the area of biology in which you choose to specialize</u>			
<u>College of Agriculture</u>			
<u>ABT 360</u>	(3)	<u>Genetics, is NOT acceptable as an upper level elective for Biology majors</u>	
<u>Substitutes for BIO 304 only if student transferred into biology major after taking this course. Cross listed as ABT/ASC/ENT/PLS 360</u>			
<u>ABT 301</u>	(2)	<u>Scientific Writing</u>	
<u>ABT 460</u>	(2)	<u>Introduction to</u>	
<u>Molecular Genetics (Cross listed as AGR/ASC/ENT 460)</u>			
<u>ABT 461</u>	(2)	<u>Introduction to</u>	
<u>Population Genetics (Cross listed as</u>			
<u>AGR/ASC/BIO/ENT 461)</u>			
<u>ABT 495</u>	(4)	<u>Experimental</u>	
<u>Methods in Biotechnology</u>			
<u>ASC 360 (3) Genetics is NOT acceptable as an upper level elective for Biology majors</u>			
<u>Substitutes for BIO 304 only if student transferred into Biology major after taking this course. Cross listed as ABT/ASC/ENT/PLS 360</u>			
<u>ASC 364</u>	(3)	<u>Reproductive</u>	
<u>Physiology of Animals</u>			
<u>ASC 378</u>	(3)	<u>Animal Nutrition</u>	
<u>ENT 310</u>	(3)	<u>Insect Pests of Field</u>	
<u>Crops</u>			
<u>ENT 320</u>	(3)	<u>Horticultural</u>	
<u>Entomology</u>			
<u>Psychology</u>			
<u>PSY 456</u>	(4)	<u>Behavioral</u>	
<u>Neuroscience</u>			
<u>PSY 459</u>	(3)	<u>Drugs and Behavior</u>	
<u>Statistics (Biology usually accepts only one of the following for each student)</u>			
<u>STA 503</u>	(4)	<u>Introduction to</u>	
<u>Statistical Methods</u>			
<u>STA 570</u>	(4)	<u>Basic Statistical</u>	
<u>Analysis</u>			
<u>STA580</u>	(3)	<u>Biostatistics I</u>	
<u>Other STA courses may be accepted at the discretion of your advisor, and this may depend upon the area of biology in which you choose to specialize</u>			
<u>College of Agriculture</u>			
<u>ABT 460</u>	(2)	<u>Introduction to</u>	
<u>Molecular Genetics (Cross listed as AGR/ASC/ENT 460)</u>			
<u>ASC 364</u>	(3)	<u>Reproductive</u>	
<u>Physiology of Animals</u>			
<u>ASC 378</u>	(3)	<u>Animal Nutrition</u>	
<u>ENT 310</u>	(3)	<u>Insect Pests of Field</u>	
<u>Crops</u>			
<u>ENT 320</u>	(3)	<u>Horticultural</u>	
<u>Entomology</u>			
<u>ENT 360</u>	(3)	<u>Genetics is NOT acceptable as an upper level elective for Biology majors</u>	
<u>Substitutes for BIO 304 only if student transferred into Biology major after taking this course. Cross listed as ABT/ASC/ENT/PLS 360</u>			
<u>ENT 402</u>	(3)	<u>Forest Entomology</u>	
<u>(cross listed as FOR 402)</u>			
<u>ENT 460</u>	(3)	<u>Intro to Molecular</u>	
<u>Genetics (cross listed as ABT/ASC/FOR 360)</u>			
<u>ENT 561</u>	(4)	<u>Medical Entomology</u>	
<u>ENT 564</u>	(4)	<u>Insect Taxonomy</u>	
<u>ENT 568</u>	(3)	<u>Insect Behavior</u>	
<u>FOR 315</u>	(3)	<u>Conservation</u>	
<u>Biology</u>			
<u>FOR 340</u>	(3)	<u>Forest Ecology</u>	
<u>FOR 375</u>	(3)	<u>Taxonomy of Forest</u>	
<u>Vegetation</u>			
<u>FOR 402</u>	(3)	<u>Forest Entomology</u>	
<u>FSC 530</u>	(5)	<u>Food Microbiology</u>	

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<u>ENT 360</u> (3) Genetics is NOT acceptable as an upper level elective for Biology majors Substitutes for BIO 304 only if student transferred into Biology major after taking this course. Cross listed as ABT/ASC/ENT/PLS 360	<u>NRC 320</u> (3) <i>Data Collection Techniques</i>
<u>ENT 402</u> (3) Forest Entomology (cross listed as FOR 402)	<u>NRC 420G</u> (4) <i>Taxonomy of Vascular Plants</i>
<u>ENT 460</u> (3) Intro to Molecular Genetics (cross listed as ABT/ASC/FOR 360)	<u>NRC 450G</u> (3) <i>Biogeochemistry</i>
<u>ENT 461</u> (2) Intro to Population Genetics	<u>NRC 455G</u> (3) <i>Wetland Delineation</i>
<u>ENT 561</u> (4) Medical Entomology	<u>PLS 320</u> (4) <i>Woody Horticultural Plants</i>
<u>ENT 564</u> (4) Insect Taxonomy	<u>PLS 330</u> (2) <i>Herbaceous Horticultural Plants I</i>
<u>ENT 568</u> (3) Insect Behavior	<u>PLS 332</u> (2) <i>Herbaceous Horticultural Plants II</i>
<u>FOR 315</u> (3) Conservation Biology	<u>PLS 366</u> (3) <i>Fundamentals of Soil Science</i>
<u>FOR 340</u> (3) Forest Ecology	<u>PLS 367</u> (2) <i>Soil and Water Analysis Lab</i>
<u>FOR 375</u> (3) Taxonomy of Forest Vegetation	<u>PLS 450G</u> (3) <i>Biogeochemistry</i>
<u>FOR 402</u> (3) Forest Entomology	<u>PLS 502</u> (3) <i>Ecology of Economic Plants</i>
<u>FOR 410</u> (3) Forest Pathology (Same as PPA 410)	<u>PLS 566</u> (3) <i>Soil Microbiology</i>
<u>FSC 530</u> (5) Food Microbiology	<u>PLS 567</u> (1) <i>Methods in Soil Microbiology (Lab)</i>
<u>NRC 320</u> (3) <i>Data Collection Techniques</i>	<u>PPA 400G</u> (3) <i>Principles of Plant Pathology</i>
<u>NRC 420G</u> (4) <i>Taxonomy of Vascular Plants</i>	-
<u>NRC 450G</u> (3) <i>Biogeochemistry</i>	<u>College of Medicine</u>
<u>NRC 455G</u> (3) <i>Wetland Delineation</i>	<u>ANA 511</u> (5) <i>Intro. To Human Anatomy</i>
<u>PLS 320</u> (4) <i>Woody Horticultural Plants</i>	<u>ANA 512</u> (4) <i>Microscopy and Ultrastructure</i>
<u>PLS 330</u> (2) <i>Herbaceous Horticultural Plants I</i>	<u>ANA 516</u> (3) <i>Anatomy of the Nervous System</i>
<u>PLS 332</u> (2) <i>Herbaceous Horticultural Plants II</i>	<i>Some other anatomy courses at the 500-level are accepted, but are usually restricted to professional students.</i>
<u>PLS 360</u> (3) Genetics is NOT acceptable as an upper level elective for Biology majors Substitutes for BIO 304 only if student transferred into Biology major after taking this course. Cross listed as ABT/ASC/ENT/PLS 360	<u>BCH 401G</u> (3) <i>Fundamentals of Biochemistry</i>
<u>PLS 366</u> (3) <i>Fundamentals of Soil Science</i>	<u>MI 494G</u> (3) <i>Immunobiology (same as BIO 494G)</i>
<u>PLS 367</u> (2) <i>Soil and Water Analysis Lab</i>	<u>MI 595</u> (2) <i>Immunobiology Laboratory</i>
<u>PLS 444</u> (4) <i>Experimental Higher Plant Biology (Same as BIO 444)</i>	<u>MI 598</u> (3) <i>Clinical Microbiology (same as PAT 598)</i>
<u>PLS 450G</u> (3) <i>Biogeochemistry</i>	<u>PGY 412G</u> (4) <i>Principles of Human Physiology</i>
<u>PLS 502</u> (3) <i>Ecology of Economic Plants</i>	<i>Acceptable as an elective for upper level biology credit but DOES NOT substitute for BIO 350 or BIO430G</i>
<u>PLS 566</u> (3) <i>Soil Microbiology</i>	<u>PGY 560</u> (1) <i>Pathophysiology</i>
<u>PLS 567</u> (1) <i>Methods in Soil Microbiology (Lab)</i>	<u>TOX 509</u> (3) <i>Biochemical and Environmental Toxicology</i>
<u>PPA 400G</u> (3) <i>Principles of Plant Pathology</i>	

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<p><u>College of Medicine</u> <u>ANA 395 (1-3) Independent Research in Anatomy and Neurobiology</u> <u>A total of 6 hours of 395 coursework (ANA, BCH, CHE, PSY 395) can count as electives in biology.</u> <u>ONLY BIO 395 is accepted for Honors in Biology</u></p> <p><u>ANA 511 (5) Intro. To Human Anatomy</u> <u>ANA 512 (4) Microscopy and Ultrastructure</u> <u>ANA 516 (3) Anatomy of the Nervous System</u> <u>Some other anatomy courses at the 500-level are accepted, but are usually restricted to professional students.</u></p> <p><u>BCH 395 (1-3) Independent Research in Biochemistry</u></p> <p><u>BCH 401G (3) Fundamentals of Biochemistry</u> <u>BCH 517 (3) Experimental Methods in Biochemistry</u> <u>MI 494G (3) Immunobiology (same as BIO 494G)</u> <u>MI 595 (2) Immunobiology Laboratory</u> <u>MI 598 (3) Clinical Microbiology (same as PAT 598)</u> <u>PGY 412G (4) Principles of Human Physiology</u> <u>Acceptable as an elective for upper level biology credit but DOES NOT substitute for BIO 350 or BIO430G</u> <u>PGY 502 (5) Principles of Physiology (same as BIO 502)</u> <u>PGY 560 (1) Pathophysiology</u> <u>PGY 590 (4) Cellular and Molecular Physiology</u></p> <p><u>TOX 508 (1-3) Research Methods in Toxicology (Independent Study Course-see BIO 395)</u> <u>TOX 509 (3) Biochemical and Environmental Toxicology</u> <u>TOX 560 (4) Environmental Physiology and Toxicology (same as BIO 560)</u></p>	<p><u>Other courses may be accepted at the discretion of the Director of Undergraduate Studies in the Department of Biology</u></p>
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8. Does the pgm require a minor AND does the proposed change affect the required minor? N/A Yes No

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If "Yes," indicate current courses and proposed changes below.

Current _____	<i>Proposed</i> _____
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9. Does the proposed change affect any option(s)?

N/A Yes No

If "Yes," indicate current courses and proposed changes below, including credit hours, and also specialties and subspecialties, if any.

Current _____	<i>Proposed</i> _____
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10. Does the change affect pgm requirements for number of credit hrs outside the major subject in a related field?

Yes No

If so, indicate current courses and proposed changes below.

Current <u>MA 123 or MA 113 3 or 4 hours</u> <u>all other outside the major requirements remain unchanged</u>	<i>Proposed</i> <u>MA 137 and MA 138 or MA 113 and MA 114 - 8 hours</u>
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11. Does the change affect pgm requirements for technical or professional support electives?

Yes No

If so, indicate current courses and proposed changes below.

Current _____	<i>Proposed</i> _____
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12. Does the change affect a minimum number of free credit hours or support electives?

Yes No

If "Yes," indicate current courses and proposed changes below.

Current <u>16 - 17</u>	<i>Proposed</i> <u>14</u>
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13. Summary of changes in required credit hours:

	<i>Current</i>	<i>Proposed</i>
a. Credit Hours of Premajor or Preprofessional Courses:	<u>22-23</u>	<u>24</u>
b. Credit Hours of Major's Requirements:	<u>16</u>	<u>24</u>
c. Credit Hours for Required Minor:	<u>0</u>	<u>0</u>
d. Credit Hours Needed for a Specific Option:	<u>0</u>	<u>0</u>
e. Credit Hours Outside of Major Subject in Related Field:	<u>18</u>	<u>18</u>
f. Credit Hours in Technical or Professional Support Electives:	<u>0</u>	<u>0</u>
g. Minimum Credit Hours of Free/Supportive Electives:	<u>16</u>	<u>15</u>
h. Total Credit Hours Required by Level:		
100:	<u>22-23 within major</u>	<u>24 within major</u>
200:	<u>15 - 18 within major</u>	<u>15 - 21 within major</u>
300:	<u>16 - 32 within major,</u>	<u>20 - 38 depending on elective choices</u>

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		<u>depending on electives choices</u>	<u>within major</u>
	400-500:	<u>0 - 16 within major, depending on elective choices</u>	<u>0 - 16 depending on elective choices within major</u>
i. Total Credit Hours Required for Graduation:		<u>122</u>	<u>120 (above numbers do not include General Education or College required course hours as level is unknown) See attached documentation for additional information.</u>

14. Rationale for Change(s) – if rationale involves accreditation requirements, please include specific references to that.

N/A

15. List below the typical semester by semester program for the major. If multiple options are available, attach a separate sheet for each option.

YEAR 1 – FALL: (e.g. "BIO 103; 3 credits")	<u>see attached documentation</u>	YEAR 1 – SPRING:	_____
YEAR 2 - FALL :	_____	YEAR 2 – SPRING:	_____
YEAR 3 - FALL:	_____	YEAR 3 - SPRING:	_____
YEAR 4 - FALL:	_____	YEAR 4 - SPRING:	_____

Change in Program - Bachelor of Science (B.S.) with a major in Biology Supporting Documentation

Rational for Change

For the past three years, the Department of Biology has been involved in a review of the undergraduate program in biology. The result is the development of new curricula for the Bachelor of Science (B.S.) in Biology, The Bachelor of Arts (B.A.) in Biology and the Minor in Biology.

Several areas within the biology undergraduate program were up-graded/ strengthened in order to meet the needs of a 21st century biology curriculum. These included a change in the mathematics requirements at the pre-major level, the addition of new laboratory experiences, and the development of some new courses.

The major requirements for the current B.S. and B.A. in Biology are essentially identical. The only difference between the two programs is the addition of one humanities course and one social science course in the B.A. program. The proposed program changes delineate significantly between the two degree programs

The new B.S. degree program in Biology consists of a rigorous course of study that will offer excellent preparation for further graduate study in biology or related life-science disciplines, or for entry into a professional program (Medical, Pharmacy, Dental School, etc)

The new B.A. degree program in Biology will cater to students who desire a thorough grounding in biological science, but wish also to study widely in one or more other fields.. The B.A. will allow students preparing for a variety of career tracks to acquire a strong foundation in biology, while also developing skills in other areas such as business, law, political science, art and foreign languages.

Biology Program Size = 1,400 majors (Fall 2010)

Proposed Curriculum for B.S. in Biology

1. Planned implementation date: Fall 2011
2. This proposal includes the new General Education requirements rather than the current University Studies Requirements given a possible implementation date of Fall 2011 for the new General Education program.

3. Revised B.S. in Biology

General Education Requirements

4 Nature of Inquiry courses 4 x 3 hours (Inquiry in the Natural/Physical/Mathematical Sciences course satisfied by major)	12 (9)
2 Composition and Communication Courses (CCI, CCII)	6
2 Quantitative Reasoning courses (QR I & II) (2 x 3 hours) satisfied by major	6 (0)
2 Citizenship courses (2 x 3 hrs) (1 US, 1 global)	6

College requirements

1 humanities courses	3
1 social science course	3
Third and fourth semesters of language (2 x 3 hours)	6
6 hours of free electives	6
Lab or field experience – satisfied by major	

Graduation Writing Requirement (GWR) (3 hours — choose any Humanities GWR – double dip with College requirement)

Total 48 hours (39)

Pre- major Requirements

BIO 148	3	
BIO 152	3	
BIO 155	1	
CHE 105 and CHE 111	4	
CHE 107 and CHE 113	5	
MA 137 and MA 138 or MA 113 and MA 114	8	24 hours total

Major Requirements

Minimum major requirement for graduation is 57 credit hours in courses not open to freshmen. The minimum GPA of all Major and Pre-major courses must be at least 2.0

Major CORE

1st Tier CORE:

BIO 304 - Introduction to Genetics	4
BIO 303 – Introduction to Evolution	4

2nd Tier CORE (to be taken after completion of 1st tier core)

BIO 315 – Cell Biology	4
BIO 325 – Ecology	4
BIO 350 - Animal Physiology or BIO 430G – Plant Physiology	4

All are 4 credit hour courses with an embedded laboratory component

Statistics – take any General Education Statistical Reasoning Course	3
BIO 425 or BIO 499	1

Total CORE HOURS = 24

Courses outside the Major

CHE 230, CHE 231, CHE 232	8	
PHY 211 and PHY 213 or PHY 231/241 and PHY 232/242	10	18 hours

Biology Electives

15 hours

15 hours to be chosen from 200+ level BIO courses (excluding BIO 208) or the list below. Two courses must have labs ONE of which may be BIO 395. A maximum of only six credits of BIO 395 may be used as electives in this section. A total of six hours of Independent Research (395) from biological sciences departments may be counted within the 15 hour requirement; however, only BIO 395 is accepted for Honors in Biology. Note: ANA 209, BIO 208 and PGY 206 CANNOT be used for this requirement

TOTAL HOURS IN MAJOR (excluding pre-major hours) = 57 Hours

Total Hours for graduation = 120 Hours

**COURSES OUTSIDE THE BIOLOGY DEPARTMENT ACCEPTABLE FOR
UPPER DIVISION BIOLOGY CREDIT**

Biology

ALL 200-level or above except BIO 208

Anthropology

ANT 332 (3) Human Evolution

Chemistry

CHE 226 (3-5) Analytical Chemistry*
CHE 233 (2) Organic Chemistry Laboratory II*
CHE 440 G (4) Physical Chemistry
CHE 441G (2) Physical Chemistry Lab*
CHE 442G (3) Physical Chemistry
CHE 446G (3) Physical Chemistry for Engineers
CHE 532 (2) Spectrometric ID of Organic Compounds
CHE 533 (2) Qualitative Organic Analysis Lab*
CHE 550 (3) Biological Chemistry I
CHE 552 (3) Biological Chemistry II
CHE 558 (3) Hormone Receptors and Cell Signals
CHE 565 (3) Environmental Chemistry

Geology

GLY 401G (3) Invertebrate Paleontology and evolution

Arts & Sciences

A&S 300 Acceptable as upper-level credit ONLY when offered by the Dept of Biology.
A&S 500 Acceptable as upper-level credit ONLY when offered by the Dept of Biology.

Psychology

PSY 456 (4) *Behavioral Neuroscience**
PSY 459 (3) Drugs and Behavior

Statistics (Biology usually accepts only **one** of the following for each student)

STA 570 (4) Basic Statistical Analysis
STA580 (3) Biostatistics I

Other STA courses may be accepted at the discretion of your advisor, and this may depend upon the area of biology in which you choose to specialize

College of Agriculture

ABT 460 (2) Introduction to Molecular Genetics
ASC 364 (3) Reproductive Physiology of Animals
ASC 378 (3) Animal Nutrition
ENT 310 (3) Insect Pests of Field Crops*
ENT 320 (3) Horticultural Entomology*
ENT 360 (3) *Genetics is NOT acceptable as an upper level elective for Biology majors*
Substitutes for BIO 304 only if student transferred into Biology major after taking this course. Cross listed as ABT/ASC/ENT/PLS 360
ENT 402 (3) Forest Entomology* (cross listed as FOR 402)

ENT 460	(3)	Intro to Molecular Genetics (cross listed as ABT/ASC/FOR 360)	
ENT 561	(4)	Medical Entomology*	
ENT 564	(4)	Insect Taxonomy*	
ENT 568	(3)	Insect Behavior	
FOR 315	(3)	Conservation Biology	
FOR 340	(3)	Forest Ecology*	
FOR 375	(3)	Taxonomy of Forest Vegetation	
FOR 402	(3)	Forest Entomology*FSC 530	(5) Food Microbiology*
NRC 320	(3)	Data Collection Techniques*	
NRC 420G	(4)	Taxonomy of Vascular Plants*	
NRC 450G	(3)	Biogeochemistry	
NRC 455G	(3)	Wetland Delineation	
PLS 320	(4)	Woody Horticultural Plants*	
PLS 330	(2)	Herbaceous Horticultural Plants I*	
PLS 332	(2)	Herbaceous Horticultural Plants II*	
PLS 366	(3)	Fundamentals of Soil Science	
PLS 367	(2)	Soil and Water Analysis Lab*	
PLS 450G	(3)	Biogeochemistry	
PLS 502	(3)	Ecology of Economic Plants	
PLS 566	(3)	Soil Microbiology	
PLS 567	(1)	Methods in Soil Microbiology (Lab)*	
PPA 400G	(3)	Principles of Plant Pathology*	
College of Medicine			
ANA 511	(5)	Intro. To Human Anatomy*	
ANA 512	(4)	Microscopy and Ultrastructure*ANA 516 (3)	Anatomy of the Nervous System*

Some other anatomy courses at the 500-level are accepted, but are usually restricted to professional students.

BCH 401G	(3)	Fundamentals of Biochemistry
MI 494G	(3)	Immunobiology (same as BIO 494G)
MI 595	(2)	Immunobiology Laboratory*
MI 598	(3)	Clinical Microbiology (same as PAT 598)
PGY 412G	(4)	Principles of Human Physiology

Acceptable as an elective for upper level biology credit but DOES NOT substitute for BIO 350 or BIO430G

PGY 560	(1)	Pathophysiology
TOX 509	(3)	Biochemical and Environmental Toxicology

Other courses may be accepted at the discretion of the Director of Undergraduate Studies in the Department of Biology

Summary of Changes in Program

1. Pre-major Requirements

- ❖ The current introductory biology course sequence is changed from BIO 150, BIO 151, BIO 152 and BIO 153 to BIO 148, BIO 152 and BIO 155.
- ❖ BIO 148 is a new 3 credit hour lecture-only course
- ❖ BIO 155 is a new 1 credit hour biology laboratory course.
- ❖ New Course paperwork for both of these courses has been submitted with this proposal.
- ❖ Both of these courses are currently being piloted under the A&S 100 prefix. Students who successfully complete this pilot course satisfy the current BIO 150, BIO 151 and BIO 153 requirement for the Biology major.

- ❖ The mathematics requirement has been increased from one calculus course to two. The Department of Mathematics has developed two new courses (MA 137 Calculus I (Life Sciences) and MA 138, Calculus II (Life Sciences) specially for the Biology Program. These courses were approved in 2009/2010. MA 137 was piloted under the A&S 100 prefix in Fall 2009. MA 137 will satisfy the Quantitative Foundations course requirement of the General Education program. This course is currently in the Gen. Ed. approval process. All but two of our benchmarks require two mathematics courses for their B.S.in Biology programs.

- ❖ The introductory chemistry requirement remains unchanged. CHE 105 and CHE 111 combined will satisfy the Inquiry in the Natural, Physical and Mathematical Sciences general Education requirement.

2. Major CORE Requirements

- ❖ The current CORE courses (BIO 304, BIO 315, BIO 325, BIO 350 and BIO 430G) have all been updated and all now include an embedded laboratory component. The bulk of the program laboratory experiences have been shifted from the freshman level (100-level) to the sophomore/junior level (300-level). This will provide students with a much more intensive and focused laboratory experience and will better prepare students for careers in biology.
- ❖ The BIO 350 course change from lecture/recitation to lecture /laboratory was approved during 2009/2010. The course is being offered in the new format in Fall 2010.
- ❖ The BIO 325 course change from lecture/recitation to lecture/laboratory was approved by the College of Arts and Sciences Educational Policy Committee in 2009/2010 and as of August 20, 2010 is awaiting approval at the Undergraduate Council level. The BIO 325 laboratory component is being piloted in Fall 2010 under the A&S 300 prefix and will be fully implemented in Spring 2011.
- ❖ The BIO 304 course change from lecture/recitation to lecture /laboratory accompanies this proposal. The new format course is being piloted in Fall 2010 under the A&S 300 prefix and will be fully implemented in Spring 2011.
- ❖ The BIO 315 and BIO 430G course changes from 3 credit hour lecture-only format to a 4 credit hour lecture/laboratory format accompany this proposal. The BIO 315 lecture/lab will be piloted in Spring 2011 under the A&S 300 pre-fix. BIO 430G will be offered in the new format in Fall 2011.

- ❖ A new evolution course (BIO 303 – Introduction to Evolution) has been added. This is a 4 credit hour (lecture/recitation) course. The paperwork for this new course has been submitted. This course is being piloted in Fall 2010 under the A&S 300 prefix. This pilot course has an enrollment of 100 students.
- ❖ A statistics requirement has been added to the program.

3. Courses outside the Major

- ❖ No change

4. Biology Electives

- ❖ Change from 16-17 hours to 15 hours. This decrease is offset by the increase in hours within the CORE. The proposed list of approved courses is shorter than the current list. Duplicate courses (those cross-listed with BIO) and those no longer offered have been removed.

5. Hours in Program

- ❖ Total hours of major requirements has increased from 50 to 57
- ❖ Hours required for graduation has decreased from 122 to 120.
- ❖ The numbers given in response to question 13 h (on the Change of Program Form) are incomplete due to lack of information on the numbering of new General Education courses.

- ❖ The proposed program assumes the following:
 - Incoming students immediately enter MA 137 or MA 113. Remedial mathematics courses are not required
 - Incoming students test-into the third semester of a language - that they have met the University entrance requirement of "Two credits in the same foreign language or demonstrated competency"
 - Students that meet these requirements can complete the program in four years. Those that require remedial work will require at least one additional semester to complete the program.

6. 4-year Plan for B.S. in Biology CURRENT

<p>Freshman Fall</p> <p>ENG 104 4</p> <p>CHE 105 3</p> <p>MA 123 or MA 113 3 or 4</p> <p>USP HUM 3</p> <p>CHE 111 1</p> <p style="text-align: right;">14 - 15 hours</p>	<p>Freshman Spring</p> <p>BIO 101 1</p> <p>BIO 150 3</p> <p>BIO 151 2</p> <p>CHE 107 3</p> <p>CHE 113 2</p> <p>USP SS 3</p> <p style="text-align: right;">14 hours</p>
<p>Sophomore Fall</p> <p>BIO 152 3</p> <p>BIO 152 2</p> <p>CHE 230 3</p> <p>CHE 231 2</p> <p>Language 1 4</p> <p>GWR 3</p> <p style="text-align: right;">17 hours</p>	<p>Sophomore Spring</p> <p>BIO 315 3</p> <p>BIO 325 4</p> <p>CHE 232 3</p> <p>USP HUM 3</p> <p>Language II 4</p> <p style="text-align: right;">17 hours</p>
<p>Junior Fall</p> <p>PHY 211 5</p> <p>BIO 304 4</p> <p>BIO 350 4</p> <p>Language III 3</p> <p style="text-align: right;">16 hours</p>	<p>Junior Spring</p> <p>BIO Elective 4</p> <p>PHY 213 5</p> <p>USP SS 3</p> <p>Language IV 3</p> <p style="text-align: right;">15 hours</p>
<p>Senior Fall</p> <p>BIO Elective 3</p> <p>BIO Elective 3</p> <p>BIO 425 1</p> <p>Humanities (College) 3</p> <p>Free Elective 3</p> <p style="text-align: right;">13 hours</p>	<p>Senior Spring</p> <p>BIO Elective 3</p> <p>BIO Elective 3</p> <p>USP CC 3</p> <p>College Soc Sci 3</p> <p>Free Elective 3</p> <p style="text-align: right;">15 hours</p>
121 - 122 Hours	

4-year Plan for B.S. in Biology PROPOSED

<p>Freshman Fall</p> <p>BIO 148 (Science - Inquiry I) 3</p> <p>BIO 155 (Science – Inquiry I) 1</p> <p>CHE 105 3</p> <p>CHE 111 1</p> <p>ENG 104 (CCI) 3</p> <p>MA 137 or MA 113 (QRI) 4</p> <p>15 hours</p>	<p>Freshman Spring</p> <p>BIO 152 3</p> <p>CHE 107 3</p> <p>CHE 113 2</p> <p>MA 138 or MA 114 4</p> <p>CCII 3</p> <p>15 hours</p>
<p>Sophomore Fall</p> <p>BIO 304 or BIO 303 Evolution 4</p> <p>Inquiry II 3</p> <p>CHE 230 3</p> <p>CHE 231 2</p> <p>Language III 3</p> <p>15 hours</p>	<p>Sophomore Spring</p> <p>BIO 304 or BIO 303 Evolution 4</p> <p>Inquiry III 3</p> <p>CHE 232 3</p> <p>Language IV 3</p> <p>Free Elective 3</p> <p>16 hours</p>
<p>Junior Fall</p> <p>PHY 211 5</p> <p>QR II (Statistics) 3</p> <p>Tier 2 Core Course I 4</p> <p>Tier 2 Core Course II 4</p> <p>16 hours</p>	<p>Junior Spring</p> <p>Free Elective 3</p> <p>BIO Elective 3</p> <p>Tier 2 Core Course III 4</p> <p>PHY 213 5</p> <p>15 hours</p>
<p>Senior Fall</p> <p>BIO Elective 3</p> <p>BIO Elective 3</p> <p>Social Science 3</p> <p>Citizenship I 3</p> <p>Enquiry IV 3</p> <p>15 hours</p>	<p>Senior Spring</p> <p>Citizenship II 3</p> <p>GWR/Humanities 3</p> <p>BIO Elective 3</p> <p>BIO 425 or BIO 499 1</p> <p>BIO elective 3</p> <p>13 hours</p>
120 Hours	

7. Honors in Biology

- ❖ The requirements for Honors in Biology remain unchanged.

8. Advanced Placement (AP) Credit

- ❖ Students that earn a score of 3 in AP Biology will earn credit for BIO 102 and BIO 103 (3 credit hours each for BIO 102, BIO 103 with a grade of CR)
- ❖ Students that earn a score of 4 or 5 will earn credit for BIO 148 and BIO152 (3 credit hours each for BIO 148 and BIO 152 with a grade of CR). A student will take BIO 155 to complete the introductory biology sequence.

9. Transition from current program to new program

- ❖ The BIO 150, BIO 151, BIO 153 courses will continue to be offered through 2014/2015 to allow all students who enter the University prior to Fall 2011 to complete the current biology pre-major requirements.

10. Relationship to Other Programs

The proposed changes in the Biology program impact a number of other programs/Colleges on campus.

College of Agriculture

- ❖ B.S. in Agricultural Biotechnology
- ❖ B.S in Animal Sciences
- ❖ B.S. in Food Science
- ❖ B.S. in Forestry
- ❖ Pre-Veterinary Medicine

In April 2009, Dr. Beattie (Director of Undergraduate studies, Biology) met with then Associate Dean Mike Mullen and the members of the College of Agriculture Curriculum Committee (which includes representative of the above programs) to discuss the biology program changes. All programs, except for Pre-Veterinary Medicine, indicated that the proposed changes would not negatively impact their programs. The Pre-Veterinary Medicine program is concerned regarding the plan for the eventual discontinuation of the BIO 153 laboratory course. Given that the BIO 150, BIO 151 and BIO 153 courses will continue to be offered until at least 2014/2015, this provides adequate time to resolve this issue.

Department of Chemistry

- ❖ B.S. in Chemistry, Biochemistry option.

The Department of Chemistry has been informed of the proposed changes in the Biology program and has indicated that these changes will not negatively impact their program.

College of Education

- ❖ Special Education/LBD – Middle School Education Option / Science Content Area
- ❖ B.A in Education with a Major in Middle School Education / Science Content Area
- ❖ B.A. in Education with a major in Secondary Education (Science Education / Biology Option)

The College of Education has been informed of the proposed changes in the Biology program and has indicated that these changes will not negatively impact their program.

College of Engineering

- ❖ B.S. in Biosystems and Agricultural Engineering

Dr. Beattie met with the College of Engineering Curriculum Committee to discuss the proposed changes. The College of Engineering indicated that these changes will not negatively impact their program.

College of Health Sciences

- ❖ B.H.S./M.S. in Physical Therapy

The College of Health Sciences has been informed of the proposed changes in the Biology Program.

Other programs

Given that a significant number of Biology majors enter professional programs after they graduate, the Department of Biology has communicated the proposed curriculum changes to a number of on-campus professional programs . Dr. Beattie has met with the Curriculum Committee of the College of Medicine, and the College of Pharmacy Associate Deans and Chair of the Curriculum Committee. Both Colleges are very supportive of the proposed changes in the Biology program.

Dr. Beattie has also been in communication with the College of Dentistry (Assistant Dean, Admissions and Student Affairs) and the Academic Advisors for the Pre-Professional Programs. The proposed changes present no barriers to students entering these programs.

10. Transfer Credits from KCTCS

- ❖ Students that successfully complete BIO 114, BIO 115, BIO 116 and BIO 117 in the KCTCS system will earn credit for the introductory biology sequence: BIO 148, BIO 152 and BIO 155. Individual courses will be equated as follows:
 - ❖ BIO114 KCTCS equates to BIO 148
 - ❖ BIO 115 KCTCS equates to BIO 155
 - ❖ BIO 116 KCTCS equates to BIO 152
 - ❖ BIO 117 KCTCS equates to BIO 155 or as 1 cr hr of 100-level BIO credit (depends on whether student has also completed BIO 115)

Curriculum Map

I. Degree Title

Bachelor of Science in Biology

II. Program Mission and Goals

The mission of the Biology Undergraduate Program is to provide a curriculum that enables and encourages students to grasp and use the fundamental concepts and methods of biology in the context of contemporary society. These concepts and methods will include:

1. The nature of science—its logic and values

Students will be able to implement the scientific method to formulate and test hypotheses. In the process, they will sharpen their ability to think critically and to solve problems systematically based on evidence.

2. The conceptual foundations and knowledge base of biology

Students will demonstrate a clear understanding of the most important and fundamental theories and ideas in contemporary biology, such as evolution, heredity, levels of organization, unity and diversity, structure and function. They will be able to link key facts, research findings, and concepts to each other and to the physical, chemical, and biological environments of organisms.

3. The collection and analysis of biological data

Students will be able to gather reliable data for specific purposes using established laboratory and field methods. They will be able to analyze their data statistically, present results in tabular and graphical form, and interpret results accurately. Students will have the opportunity to conduct independent research in biological laboratories.

4. The presentation and discussion of biological research

Students will be able to present and discuss the concepts, methods, and results of biological research. They will be able to review the biological literature, critically analyze published papers, present written reports in scientific format (introduction, methods, results, discussion), and present oral reports according to current biological style. Students will be encouraged to present original research at scientific meetings.

5. The societal implications of contemporary biology

Students will demonstrate an understanding of how contemporary biology influences and is influenced by human society. They will make ethical and other qualitative judgments about scientific goals and methodology. They will also gain familiarity with possible career roles in the biological field.

III. Curriculum Map - B.S. in Biology

	MA 137/138	CHE 105/ 107/ 111/ 113	BIO 148/155	BIO 155	CHE 230/231/ 232	PHY 211/213	BIO 304/ BIO 303	BIO 315 / 325/350	Statistics	BIO 425/ 499	Biology Electives	Upper level Laboratory	Advising / Mentoring
<p>The nature of science—its logic and values Students will be able to:</p> <ul style="list-style-type: none"> • Implement the scientific method to formulate and test hypotheses. • Think critically and solve problems systematically based on evidence. 	I	I	I	I	D	D	D	A	D		D	A	
<p>The conceptual foundations and knowledge base of biology Students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate a clear understanding of the most important and fundamental theories and ideas in contemporary biology, such as evolution, heredity, levels of organization, unity and diversity, structure and function. • Link key facts, research findings, and concepts to each other and to the physical, chemical, and biological environments of organisms. 	I	I	I	I	D	I	D	A	D	A	A	A	
<p>The collection and analysis of biological data Students will be able to:</p> <ul style="list-style-type: none"> • Gather reliable data for specific purposes using established laboratory and field methods. • Analyze data statistically, present results in tabular and graphical form, and interpret results accurately. 	I	I	I	I	D	D	D	A	D	A	A	A	

	MA 137/138	CHE 105/ 107/111/113	BIO 148/152	BIO 155	CHE 230/231/232	PHY 211/213	BIO 304 / 303	BIO 315/ 325/350	Statistics	BIO 425/ 499	Biology Electives	Upper level Laboratory	Advising / Mentoring
<p>The presentation and discussion of biological research Students will be able to:</p> <ul style="list-style-type: none"> • Present and discuss the concepts, methods, and results of biological research. • Review the biological literature, and critically analyze published papers, • Present written reports in scientific format (introduction, methods, results, discussion) • Present oral reports according to current biological style. 			I	I			D	D			A	A	
				I			D	D		A	A	A	
				I			D	D				A	
										I			
<p>The societal implications of contemporary biology Students will be able to:</p> <ul style="list-style-type: none"> • Demonstrate an understanding of how contemporary biology influences and is influenced by human society. • Make ethical and other qualitative judgments about scientific goals and methodology • Discuss possible careers in the biological field. 			I				D	D	D		D		D/A
				I/D									
				I									

Rating system: I = Introduced, topics introduced, basic techniques introduced; D = Developed, content taken to a higher level, skills and content from introductory classes applied ; A = Applied level, analysis, synthesis and evaluation of content and skills.

IV. Possible Biology Undergraduate Program Assessment Approaches

- Survey graduating seniors
- Evaluation of student work (Laboratory reports, scientific papers, oral reports)
- Tracking student success in graduate entrance exams such as Medical College Admission Test (MCAT), Dental Aptitude Test (DAT), and the Graduate Record Examination (GRE).
- Tracking student success on national standard tests such as the Biology Major Field Assessment Test
- Tracking student retention and graduation rates
- Tracking student success through graduate employment
- Tracking student success through acceptance in graduate school / professional programs
- Number of undergraduate research presentations, publications
- Number of undergraduate honors, and academic awards